

Fig. 18. Palaikastro: Main Street.
By permission of the British School at Athens.

MINOAN ARCHITECTURE: A STUDY OF PRE-HELLENIC ART IN CRETE.

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(Continued from page 676.)

(d) THE STREET PLAN.

THERE is an indescribable something which one feels in walking the streets of a long-deserted, long-forgotten town. What scenes do not these silent, grass-grown, or *débris*-strewn streets give rise to; what pictures do they not call up of those who once hurried along them in pursuit of business or pleasure, or stood at their corners discussing the political situation, or the state of the crops, or the latest designs in wearing apparel. What tragedies and comedies of love and life have been played out upon the little stage of these streets; how many pulses have leapt at the sound of a lover's footstep echoing upon the flags; how many a fair beauty has known the faithlessness of the gallant who had but played with her. What pestilences may have swept those streets from time to time, leaving a grim trail of sorrow and disease and death; or perhaps it was a human tide that swept them, and, as it receded, left its pitiful mark in burnt homes and slaughtered men and dishonoured women, while the rovers made away with their booty before the country could be roused. Now all is still, with a strange, almost unearthly stillness:

the very houses seem asleep;
And all that mighty heart is lying still.*

and it is the sleep, the stillness of death, from which there is no waking. Truly it is no wonder if these sepulchres of past activity call up in us feelings often too deep for full expression.

* Wordsworth, *Miscellaneous Sonnets*, Pt. II., No. 36.

As with the buildings so with the streets, there does not appear to have been much attempt at symmetrical planning. The two town sites which have been most completely excavated—Gournia and Palaikastro—both show extremely irregular planning. At Gournia, which is built on a sort of Acropolis, a road, accounted for by the nature of the site, completely encircles the town, meeting at the southern end of it in a sort of market-place or agora, in front of the palace of the local governor. Another, the valley road, bisects the town from north to south, while two—the southernmost considerably curtailed by the palace site—cross from east to west. In addition there are various short turnings, which serve to give access to buildings lying off the chief roads.

To turn to Palaikastro (Roussolakkos)—which is not yet completely excavated—we have a long main street running south-east by north-west (Fig. 18) which gradually turns until it is running in a south-westerly direction. From this various roads lead off at right angles.

The average breadth of the main street at Palaikastro was two metres,* at Gournia† and Phylakopi‡ it was somewhat less. The side streets were naturally narrower, being in some cases

less than a metre wide, as at Praesos (Fig. 19). There is an exception to this at Palaikastro where the side street between blocks β and μ is over 12 feet wide. The streets were paved with stone. The roadway leading westwards from the Theatral Area at Knossos had a good foundation and was paved with very fine slabs bordered on each side by a sort of side walk of pebbles, clay, and pounded potsherds, with a hard rammed surface.§ The total width was about 11 feet.

At Gournia the paving stones were selected, we are told,|| from near the sea, and presented consequently a fairly smooth surface. They were laid with care, and, though not always fitting closely one to another, made a far better road than those found in Crete to-day. Short lengths of side path and gutter occurred at intervals, often approached by steps and leading to the doors of the houses (as on plan, Fig. 5). The streets themselves were stepped, as has already been mentioned, where necessary, as shown in the view of Praesos (Fig. 19). A fine example of this stepping is illustrated in Mr. Dawkins' paper on Palaikastro.¶ In this example the steps are more than a metre on tread and have an imposing appearance. They do not quite reach the wall on one side, but are stopped off to allow the passage of the channel which runs down one side of the road,



Fig. 19. Praesos: Street ascending Acropolis.
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and was quite necessary to help carry off the water after heavy rains. Even when all had been done that was possible, the steep streets of some of the Minoan towns must after severe storms have presented somewhat the appearance of cataracts.

Traffic in a Minoan town must have been entirely of a pedestrian or equestrian nature, as chariots

* R. M. Dawkins in *B.S.A.*, XI.

† Mrs. Hawes in *Gournia*.

‡ R. C. Bosanquet in *B.S.A.*, IX.

§ Evans in *B.S.A.*, X.

|| Mrs. Hawes in *Gournia*.

¶ *B.S.A.*, IX.

could never have got along most of the streets, and, even if width had allowed of their passage, the differences of level and consequent steps would have made progress any distance impossible.

Perhaps one of the most striking things about the Minoan towns is the closeness with which the houses are packed together; made all the more remarkable by the absence of any necessity to keep the houses within the limit of walls, for the latter, as has been mentioned, were quite dispensed with. We cannot help feeling, with all the past has left us, that it is quite impossible to realise adequately what the busy life must have been in these old towns, and there is a tinge of sadness in the thought that all that remains to us is—

Many a street
Whence busy life hath fled;
Where, without hurry, noiseless feet
The grass-grown pavement tread.*

VI. THE ELEVATION.

The question of elevation is perhaps the most difficult which has to be dealt with in any attempt at a systematic study of Minoan architecture. One has to rely almost entirely for knowledge on what can be gleaned from the plan, and on the faience plaques from Knossos, which give a number of elevations of town houses, towers, &c., of quite moderate dimensions. No attempt will be made here to put forward any elaborate theories as to elevation, a few points only being mentioned in illustration of certain broad principles which can be laid down with some degree of safety. Fig. 20B shows us an elevation of which the plaques give us several fairly complete examples. The original of this was, in modern terms, a half-timber building, round beams in timbered compartments forming the most prominent feature. This house has two doors, with windows immediately above, and a sort of garret window in the centre above this. The other elevation (Fig. 20A) shows what appears to be rubble faced with plaster.

It has been suggested that the Minoans were indebted to Egypt for much in the elevation of the

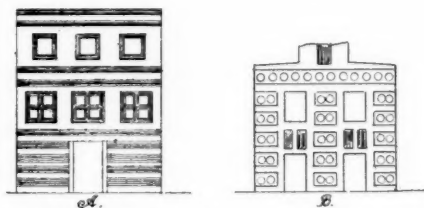


Fig. 20. Elevations from faience plaques.

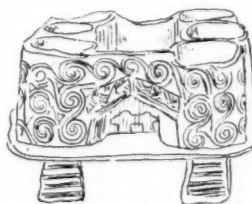


Fig. 21. The Pyxis of Melos

ordinary house.† The typical house had its broad front to the street, and the front door was in earlier times almost invariably towards the right-hand end of the façade,‡ both in the smaller houses as at Magasá and Kastri,§ and the palaces, as the M.M. I. palace at Phaestos (x on plan) and Gournia.|| This partiality for eccentric doorways, the result of the primitive type of plan, persists until the beginning of Middle Minoan times. The arrangement of porticos on the central column principle, as at Phaestos, seems to have been a typical one, and would give an elevation rather peculiar to those used to arrangements with central opening.

Windows seem to have been in greater favour for upper than for ground floor use. Those shown on the plaques are invariably on upper floors, though the remains have shown their use in the lower parts of the buildings. Verandahs were probably used in some buildings if the suggestion that has been made regarding one of the houses at Palaikastro be correct.¶ The Pyxis of Melos (Fig. 21),

* Wordsworth, *Incident at Bruges*.

† Perrot and Chipiez, *Histoire de l'Art dans l'Antiquité*.

‡ Mackenzie in *B.S.A.*, XIV.

§ *Ibid.*

|| Mrs. Hawes, *Gournia*.

¶ R. C. Bosanquet in *B.S.A.*, XI.

while it must not be taken too seriously as representing an actual elevation, is at least suggestive, especially with regard to the entrance with its gabled portico.

The terraces and flat roofs, rising in great steps one above the other, must have given to the elevations that Oriental aspect with which all who have visited the East must be familiar. We can well believe that the general effect must have been most satisfactory. The architect who was capable of achieving such splendid results—speaking now from the point of view of exterior effect alone—as have been attained in the state entry at Phaestos (Fig. 16) or the Northern or Propylæum entrances at Knossos, cannot have been insensible to the effect of his building as a whole, and the first approach to such a building as the Phaestos Palace, rising high above the plain, must have been an experience long remembered. Even now in the days of its ruin it is impressive enough to one who sees it for the first time. A good idea of what must have been the effect of the interiors may be obtained from the restoration which has been carried out in the case of the Grand Staircase and Hall at Knossos. To quote Sir Arthur Evans's own words concerning it:*

As a whole this legitimate process of reconstruction is such that it must appeal to the historic sense of the most unimaginative. To a height of over twenty feet there rise before us the Grand Staircase and Columnar Hall of Approach, practically unchanged since they were traversed, some three and a half millenniums back, by Kings and Queens of Minos' stock, on their way from the scenes of their public and sacerdotal functions in the west wing of the palace, to the more private quarters of the Royal household.

One can well believe that the ambassadors who came to Crete from Egypt or elsewhere would carry back with them such a story of stately buildings and developed civilisation that their monarchs would treat this little island empire with considerable respect.

VII. CONSTRUCTION.

(a) WALLS.

Sunk are thy bowers in shapeless ruin all,
And the long grass o'ertops the mouldering wall.†

Questions of construction must always be of very great interest to the architect, since every other question, whether it be the size of an opening, the style of the carving on a frieze, or the enduring power of the fabric as a whole, must rest ultimately on the basis of materials and construction.

There is often considerable difficulty, more particularly at Knossos, in distinguishing what was part of earlier construction and what was added later, as the later builders often incorporated old walls, and even made use of old systems of construction in their additions and alterations, much as, say, an old church partially destroyed by fire will be treated in the present day. No stone walls have been discovered in the Neolithic remains at Knossos. This, to those who know the stone building of Neolithic times at Magasá and the abundance of local stone used later at Knossos, will appear very curious. The explanation lies in the fact that the stone at Knossos is not a surface stone. Small stones fixed with mud were used, according to Pernier, in Neolithic building at Phaestos.

Mud bricks were plentifully used—except at Knossos, where there seems to have been a sparing use of inferior bricks—throughout the different periods, and probably played an important part in Neolithic huts. The peculiar yellowish brown soil resulting from the calcined remains of brickwork is one of the most frequent and most trusted indications of a hidden site. These bricks were often well made and very durable. They varied in size from about 2 ft. square to 13½ in. by 12 in.,‡ and were 3½ in. to 4 in. thick. They were usually laid in a kind of mud mortar. A very usual method of employing them was to use rubble for the walls of the lower story and employ brickwork above. In other cases, as house A at Zakro,§ walls were carried up from the ground in brick. In such cases stone was still used for the foundations.

* B.S.A., XI.

† Goldsmith, *The Deserted Village*.

‡ D. G. Hogarth in B.S.A., VII.

§ *Ibid.*

Mud-built walls were occasionally employed, but the favourite material for walling in the ordinary houses was rubble: this was also largely employed in the walls of more pretentious buildings, as the Palace at Gournia.* The extensive use of rubble for walling led to the use of a system of timber framing between which the rubble was filled in, as at Knossos.† The wooden posts represented in the Temple Fresco are of great interest in this connection. The black squares recurring at intervals undoubtedly represent the ends of cross pieces socketted into the posts.‡ In the Palace construction it is usual to find large corner blocks of gypsum having grooves to give the rubble a good hold. Where rubble work was employed the usual process was to put in good stone footings and then build upon these. In house A Palaikastro the corner stones of these footings are very large.§

As might be expected, early methods of construction lingered on in remote country towns long after they had been superseded by more up-to-date methods at the great centres; but even the conservative builders of the smaller towns at last adopted better methods, as at Palaikastro, where the earlier masonry of small stones roughly dressed, gave way to fairly regular coursed work, in which limestone from Cape Sidhero was largely used.|| Ashlar of Paros stone was not usually used until L.M. III. At Gournia except in some parts of the Palace no ashlar appears to have been employed at all; ¶ rubble and sun-dried bricks with the usual timbers were in normal use. The stones used were water-worn boulders and limestone, while a small amount of slate, gypsum, and sandstone was also employed.** In the earlier work the small stones were set in a relatively large mass of clay: the whole was then given a good finish by the application of a hard lime plaster. Later—as in the Town Period at Gournia ††—larger flat-faced stones were used with less mortar, the stones being wedged in with spalls, while in the other cases small boulders and round stones were employed.

Building was better, according to Mrs. Hawes,‡‡ in the first and third periods, than in the second, because in the first the builders were using materials which were easy to work with—small stones and clay—and in the third they had obtained mastery over difficult materials, while in the second they were struggling towards efficiency. This theory of decrease of efficiency, though it sounds plausible, seems to the author to be false at bottom, because decrease of efficiency must mean, surely, a decrease of energy and power, whereas the reverse was in reality the case; the builders were going onwards all the time, as is evidenced by the very fact that they had the courage to attempt building in more difficult materials than they had yet handled. There is undoubtedly progress from the beginning of the first period onwards, and it is the last period when decrease of efficiency and decline take place.

Ashlar limestone construction was throughout the Minoan Age, Dr. Mackenzie tells us, a continuous tradition of palace architecture.§§ This was mainly due to practical considerations, such as the necessity for its use in such positions as the terracing up of slopes, as, for instance, in the East Bastion at Knossos. It seems to have been an unwritten law of the best architectural practice to use ashlar construction in all positions where the stonework would be subject to the effects of the weather, as in the light well to the state entry at Phaestos, the Court of the Distaff, or the east façade of the Palace of Knossos. The extremely massive construction of the north façade of the central court at Phaestos—the whole of which was built in fine ashlar work—was probably ||| owing to the violent wind and rain storms its builders knew it would have to withstand. In ashlar work the courses were sometimes laid receding, the face of the stone in one course being set back a little from that of the course below.

Gypsum and limestone were frequently used in combination. In the west wall of the South-East House there is a base of limestone, with a plinth of similar material upon it: this is surmounted by three courses of gypsum, and then two more of limestone. The whole had a rubble backing.

* Mrs. Hawes in *Gournia*.

† Evans in *B.S.A.*, VII.

‡ Fyfe in *Journal R.I.B.A.*, 1902.

§ Bosanquet in *B.S.A.*, VIII.

|| R. M. Dawkins in *B.S.A.*, XI.

¶ Mrs. Hawes in *Gournia*.

** *Ibid.*

†† *Ibid.*

‡‡ *Ibid.*

§§ *B.S.A.*, XI.

||| *B.S.A.*, XI.

Strange as it may seem, there appears to have been a great desire to economise ashlar work, and it is the normal practice for thick walls to consist of two faces of massive slabs—usually of gypsum or limestone—with a core of rubble. The whole was tied together by cross-pieces of wood which were let into dovetailed slots in the inner faces of the slabs.* This combination of wood with masonry existed throughout the whole of the Minoan period. It became ingrained in the minds of the builders from constant use in connection with rubble work and was still used when the need for it no longer existed. The short beams laid across the thickness of the wall are found repeated in ashlar work at Knossos, while the presence of a horizontal course of wood, immediately under the coping of a dwarf wall or at some intermediate point in the wall, as in many of the rooms at Knossos, was quite normal. In some cases, as in the Royal Villa, there were thin walls of gypsum slabs with clay filling between. The gypsum wall to the staircase in the same building is one of the finest pieces of masonry yet discovered.

Walls were sometimes built against the earth or the solid rock, in which case great care was taken to guard against damp. In the case of that portion of the Palace at Knossos bordering the staircase, the Court of the Distaffs, &c., where the wall was below natural ground level, two walls were built,† one only a few centimetres from the other, thus forming an air space to prevent the passage of moisture. At other points light areas, corridors, &c., were arranged directly about these outer walls.

In later remodellings old walls were often fronted ‡—sometimes with a space of some feet between the two, as in the Central Court, Knossos—with new erections of the later builders. Partitions were in many cases very thin, sometimes no thicker than those in the modern suburban house; they were composed of various materials, gypsum slabs being a favourite one. Some of these thin partitions were undoubtedly strengthened by wooden framing.§ Sliding wooden partitions were probably used || in some positions, as on the low terrace wall west of the magazines of the Knobbed Pithoi, where they probably partitioned off kennels.

The plastering was often very thick owing to its being applied to rough rubble walls, the backing of coarse stuff being sometimes as much as $2\frac{1}{2}$ in., while the finishing coat was usually $\frac{3}{4}$ in. in thickness, though on some of the thin partitions which have been already mentioned it was not more than half an inch, while on the splendid gypsum wall in the Royal Villa at Knossos, already referred to, there was only the very thinnest coating of red stucco. The backing was often chiefly composed of clay, but the finish was usually excellent, gypsum being readily obtainable: some plaster shows a surface almost like that of marble. The finishing of plaster to woodwork was the opposite of the present method, the plaster being splayed back to afford a hold for the wood.¶ Plaster ceilings seem to have been the rule and not the exception at Knossos. Plaster was used externally as well as internally, the finishing coat being often, in such cases, coloured a light bluish grey.** The use of plaster for pavements was quite normal; when it was applied over flagstones, it was usually somewhat coarse, but when the base consisted of pozzolanic cement a fine kind was employed. Brick clay was much used especially in L.M. times as a facing, more particularly externally, but was greatly inferior to the plaster work of earlier date. Even in the case of ashlar masonry the walls were often covered with brick, earth or plaster.

(b) SUPPORTS.

Owing to the frequency of colonnades between room and room, which, as has already been seen, arises largely from climatic conditions, the supports, whether they be piers or columns, assume an importance far greater than they have in the mainland type of plan; they go far to make or mar the appearance of the interiors, and in addition are largely responsible for carrying the upper walls. The rectangular pier is of frequent occurrence, and usually has a square base: it seems to have been some-

* Evans in *B.S.A.*, XI.

† Evans in *B.S.A.*, VIII.

‡ Evans in *B.S.A.*, X.

§ Evans in *B.S.A.*, IX.

|| Evans in *B.S.A.*, VIII.

¶ Fyfe, *Journal R.I.B.A.*, 1902.

** Mrs. Hawes in *Gournia*.

what earlier in date than the column. At Gournia, for instance, the supports in the earlier part of the town period were always rectangular piers,* while in Re-occupation times rectangular and circular forms occur side by side, the latter ultimately ousting the former altogether. The north portico, Knossos, is another example of this, belonging to the earliest remains of the palace and having square piers of gypsum, while in the Early Minoan basement † there are two square monolithic piers of limestone, which rest on a broad base of the same stone. This monolithic character is also characteristic of early work.‡ The recessing of many of these piers to take the doors with which the openings between them were fitted will be alluded to later. An interesting feature is found in magazines 7 and 9, where two piers of good limestone masonry were added after the walls were built, evidently to take the pillars of a reconstructed upper hall.

In determining the nature of the columns used by the Minoans, the Frescoes are of the greatest use, giving us paintings of a feature of which no examples have been found. The Temple Fresco gives us a miniature representation of what is almost certainly the front of a shrine or sanctuary of wood with painted wooden columns. The base of the building appears to have been of stone, and the same material was apparently used in the entablature. Fig. 22 shows three examples of this Order.§ In every case the taper of the column is reversed from what was the invariable rule in Classic times. Type I. is reminiscent of the Doric Order in that it has no base. The cap of this column is very similar to an inverted Attic base. The caps of II. and III. are most like what is regarded as the typical Mycenaean cap, as shown in the Treasury of Atreus (remains of columns now in the British Museum). Even with the limited knowledge of this feature that we possess, enough has been discovered to enable us to assert at least tentatively that Type III. is the most distinctively Minoan of these forms. Luckily, however, since Sir Arthur Evans carried out his 1905 excavations, we have not been entirely dependent on representations for our knowledge of the Order employed.

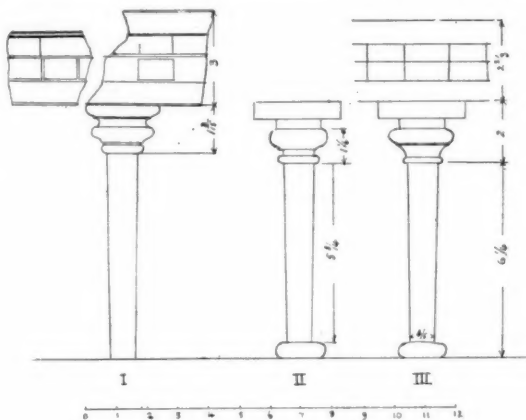


Fig. 22. The Minoan Order.

During the period of re-occupation (he writes, speaking of the House of the Fetish Shrine) the openings between three of the wooden columns which had originally stood on the round stone bases of the balustrade on the side facing the small corridor had been blocked and half of their diameter had been embedded in a clay and rubble walling, which must effectually have shut out the light from the passage way. So it comes about that, when later the wooden shafts themselves were destroyed by fire, they left in the plaster of the wall behind them almost perfect casts of their embedded halves.

The discovery of the actual charred remains of these and other columns which have been discovered on the spots they originally occupied, has disposed once and for all of the theories of an original stone type for the orders.

Columns were sometimes fluted,¶ both the concave and convex forms being used. It is significant that in the House of the Fetish Shrine the columns were found to have had 20 flutes, the same number as the Greek Doric usually possessed. Though no actual structural columns remain to us, there are a number of pedestals of lamps, &c., of stone in the form of columns still remaining. A very fine one** was discovered in 1900. It is of purple gypsum, quatrefoil in section, decorated with lotus and papyrus.

* Mrs. Hawes in *Gournia*.

† Evans in *B.S.A.*, IX.

‡ *Ibid.*

§ Fyfe, *Journal R.I.B.A.*, 1902.

¶ *B.S.A.*, XI.

¶ Evans in *B.S.A.*, XI.

** Evans in *B.S.A.*, XI.

A portion of another, finely carved, was found in the South-East House and is illustrated in B.S.A. IX.

The Grand Staircase at Knossos still shows the sockets which took the wooden columns (Fig. 11), while in the hall of the Royal Villa there are two column bases, of a stone resembling granite, resting on a limestone stylobate. In many cases these bases still show the original dowel holes.

The question of the Order is a most fascinating one and would well repay exhaustive and critical study, and it is surely not too much to hope that fresh finds may throw light on other features in the Doric Order which have as yet been unaffected by Cretan discoveries.

(c) OPENINGS.

There seems to have been fashion in door openings as in many other things, and at one time narrow and at another wide openings seem to have been the rule: a most interesting example of the changes passed through is afforded by the case of the magazines at Knossos, where wide gave way to narrow and was in its turn again superseded by the wide opening. Contemporary with this last change seems to have been the covering of many of the cists with paving * and the reduction of others to half their former depth. The openings were undoubtedly fitted in very many cases with doors, † and it is probable that in some cases at least they had wooden door frames within the jamb reveals. It seems to have been an almost invariable rule that where a single door was used there should be only one reveal, two reveals going with double doors. The doors were kept closed by means of bolts which shot into holes in the thresholds, and were always controlled from the side towards which they opened. When open they folded back against the piers and formed an integral part of them.

The jambs were constructed variously. In the more pretentious buildings these were often of carefully finished ashlar, but in the ordinary private houses brick clay covered with plaster ‡ seems to have been the most usual construction, while wood or rubble faced with plaster was sometimes used. In the house shown in Fig. 5 the back door had a frame consisting of three large stones. Internal as well as external doorways were often constructed with stone sills and stone jamb bases.§

The window openings seem to have been fitted with wooden frames of quite modern form. In the palace at Knossos window openings in many cases still show the dowel holes for fixing these frames.|| Of the greatest possible interest in this connection are the actual remains of the framework of a large double window ¶ in the room of the Plaster Couch. In some of the faience plaques the upper openings extend down to the floor and seem to represent windows opening on to balconies, such as appear in some of the miniature frescoes with groups of ladies at them.

(d) STAIRCASES.

Crete stands alone in the remains she has given us of staircases. Nowhere have we anything approaching what is left to us in the Royal Villa, or in many smaller houses; while the Grand Staircase, which has been referred to so many times already, absolutely stands in a place by itself. There were doubtless many ladders and staircases of wood used in the less important buildings ** and even in the palaces in unimportant positions, leading down to cellars, for service staircases, &c., as the one at Knossos adjoining the hall of the colonnades. The remains of these, other than a few charred fragments, have however disappeared, those staircases which still remain in whole or part being all of stone. Speaking, as in this section, from a constructional point of view, it is quite unnecessary to say much about them. Their construction was of a simple straightforward character, much as would be employed in a similar situation by a good builder of to-day. The stairs were either of gypsum or limestone; sometimes both were used in combination, as at the Royal Villa, Knossos.††

* Evans in B.S.A., X.

† Evans in B.S.A., IX.

‡ Mrs. Hawes in *Gournia*.

§ *Ibid.*

|| Evans in B.S.A., VIII.

¶ *Ibid.*

** Many examples in *Gournia* and in B.S.A.

†† Evans in B.S.A., IX.

Where stairs were carried above a hollow space it is interesting to note that the landing blocks had ledges cut on them to give support to the lower steps of the ascending flight.* Where a central staircase wall was of rubble, it invariably had the large grooved gypsum blocks already referred to, to keep the rubble work securely in position. In some cases double-headed staircases were employed, of which one remains at the Royal Villa (Fig. 17), but this did not involve any material complication of the constructional problems. Columns were sometimes employed in conjunction with the staircase wall, as at Knossos (Fig. 23).

(e) FLOOR AND ROOF.

The methods of dealing with the floors varied from the very simplest to the most elaborate. In some cases the floor would be nothing more than the natural ground, beaten down to a hard and fairly flat surface, in others it might consist of plaster, or stone. Upper floors were often constructed of stone. Where the floors were covered with cement it was usually composed of sand and powdered potsherds, or limestone and small pebbles, mixed with a cement-like material, probably some form of lime.† This cement was usually laid on a foundation. In the Royal Villa this consisted of small pieces of limestone and gypsum slabs.‡ In one of the magazines opened up on the road to the House of the Fetish Shrine this foundation was evidently very carefully formed. It consisted first of a layer of tough grey earth, then a layer of potter's red earth, and over this was laid the layer of fine stucco cement, with a mixture of very small pebbles, the whole being finished to a fine surface.§

In the house at Gournia (Fig. 5) the floor of the court is paved with small boulder stones, while the courtyard of the palace was paved with concrete compounded of small pebbles, unburnt gypsum powdered up, and Santoria earth (pozzolana).|| In the South-West House there is a pavement of dark grey ironstone,¶ while in the megaron in the same building the floor is of terra-cotta-coloured stamped clay. Flooring of large gypsum slabs was sometimes used, as in the central hall of the Royal Villa, where a good sized central slab is surrounded by a slab border, and this border by another similar one.** The intervals between the borders were filled in with plaster or cement, which was coloured red and suggests that the whole space may have been coloured. Limestone slabs were also frequently used, as in the Theatral Area at Knossos: in this particular instance the slabs were probably covered with plaster.

The stone cists or kasselles (Fig. 9) form an interesting feature for study. Rows of these were found under the long gallery and in the floors of the magazines. They served in some cases undoubtedly largely as storage places for oil, &c., while in others they may have been used as safes for valuables. Their sides were formed of stone slabs of gypsum or limestone, the slab in the former case being rebated



Fig. 23.

Knossos: Upper Portion of one of the Staircases.
By permission of the Hellenic Society.

* Evans in *B.S.A.*, VIII.

† Dr. Mackenzie in *B.S.A.*, XI.

‡ Evans in *B.S.A.*, IX.

§ Evans in *B.S.A.*, X.

|| Mrs. Hawes in *Gournia*.

¶ Evans in *B.S.A.*, IX.

** *Ibid.*

into the bottom slab. Between the slab and the masonry retaining walls, a space was left, and filled in with red earth which seems to have been used for keeping off the damp. In rare cases a wood backing was used. They were in most case lined with lead, and seem to have been covered with wooden lids.

The stone repositories of the Central Palace area are especially interesting. They are some 6 feet by 4 feet 6 ins. by 5 feet deep—though varying a little in size. The Eastern Repository was built of solid blocks of limestone in three courses, the lowermost resting on a single slab forming the bottom: the dowel holes still existing suggest an original wooden framework. The Western Repository was not so massive in construction: its sides, which were dovetailed together,* were formed of grey limestone, and behind these slabs there was a rubble backing.

A house at Palaikastro† has furnished important evidence with regard to the method of roofing the ordinary town house. By great good fortune—for us—the house was destroyed by fire, and the heat baked and preserved some of the clay of which the roof was composed. The foundation of the ceiling was reeds, upon which was placed the first layer of clay: the second layer, which had sea-weed incorporated with it to render it more watertight, was laid upon this foundation. It says much for the conservative instinct which seems to be ingrained in men that this method is still in use in Crete to-day for native building. In the pillar room of the Royal Villa, just opposite the top of the pillar, an opening was left for a large square beam, which evidently rested on the pillar and was the principal support of the roof. A little higher than this the top course of the west wall has some holes of a semi-circular shape to receive the cross beams. The timber used was evidently very massive, the main beam being 80 centimetres by 60; cross beams, 44 centimetres diameter. Little as we know of the roof, compared with other parts of the building, we must feel thankful that any remains at all of this feature have been preserved to us.

VIII.—SANITATION.

If one were asked, out of the many remarkable things which have been discovered in connection with Minoan architecture, to pick one that was more striking than any other, the choice would probably fall upon the drainage system. One is used to finely proportioned buildings, beautiful sculpture, rich tapestries, and wonderfully illuminated books; to triumphs of engineering skill or marvels of minute workmanship, which have been left to us as a heritage from widely differing peoples and from widely differing times; but any scientific system of sanitation is unknown, whether we consider Egypt, Hellenic Greece, or Mediæval England. Yet when one turns to Crete a highly developed system of drainage is discovered which stands unrivalled, except by modern sanitation, and to which—except in the case of pre-Sargonic Babylon‡—there is no approach in ancient times.

The most complete sanitary system yet discovered is that of the Palace at Knossos, and it is consequently chiefly to this that attention will be directed. The system consists of a main drain or sewer with branches entering it at various points, and with cleaning eyes, inspection chambers, &c., much as in a modern drainage system. Stone shafts were run up to take the discharge from fittings on the upper floors and also the rainwater from the roof; and these acted at the same time as ventilators to the whole system.§ The terra-cotta drain pipes|| (Fig. 24) were circular in section, some 70 centimetres (2½ feet) long, and tapered from a diameter of 15·3 centimetres (about 6 inches) to 9·3 centimetres (less than 4 inches); they fitted one into another, the cracking of one pipe by the next one being forced into it being prevented by means of a stop ridge round the outside of the narrow end, which fitted against a raised collar on the butt of the next pipe; the joint was made in most approved style in cement. Pipes of this form have been found at Phaestos and by Dörpfeld, outside Crete, at Leukas. Some pipes of a similar form but without the stop ridge have also been discovered.

* Evans in *B.S.A.*, IX.

† R. M. Dawkins in *B.S.A.*, X.

‡ Burrows' *Discoveries*, ch. i.

§ Evans in *B.S.A.*, VIII.

|| *Ibid.*



Fig. 24. Drain Pipe from Knossos.



Fig. 27. Terra-cotta Bath.
By permission of the Hellenic Society.

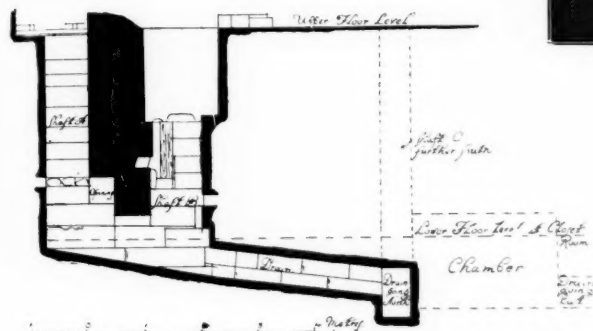


Fig. 25. Knossos: Section of Drains in Domestic Quarters.

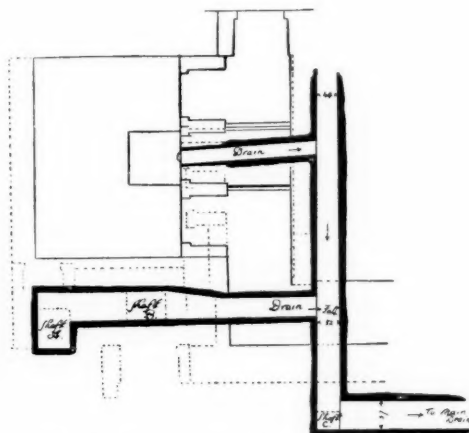


Fig. 26. Knossos: Plan of portion of Drainage in Domestic Quarters.

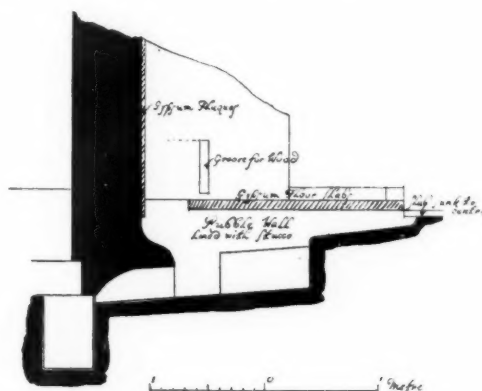


Fig. 28. Knossos: Water Closet.

The main drains, which are rectangular in section (Fig. 25), were of limestone slabs rendered inside: they were often of such a size that a man could easily pass along them. No care seems to have been taken to secure an easy bend in the drain (see turn at manhole, c, Fig. 26), but the flow of sewage was assisted by a good fall on the drains, and even an absolute drop appears at intervals. Manholes were provided where necessary, as in Figs. 25 and 26, which represent the drainage of a small portion of the domestic quarter of the Palace at Knossos. Various branches exist, leading from what may have been latrines, sinks, baths, &c., indeed one of the latter still exists (see Fig. 27); but undoubtedly the most interesting object in the whole of the sanitary remains is the w.c. opening off the room of the Plaster Couch (Fig. 28). The floor and partition walls of this apartment consisted of gypsum slabs: a groove still remaining in one of these slabs shows where the seat riser must have been housed into the partition. Immediately under the seat will be seen, by reference to the diagram, a curiously curved projection which was originally rendered in cement and which doubtless had a counterbalance flap in conjunction with it, to keep the evil smells from the drain with which the cavity was connected from entering the house. The apparatus was probably flushed down after use by means of a jug or other water vessel which stood at one side of the seat,* this being the most likely reason for the drain not being placed centrally in the compartment, but to one side. The whole system could be flushed down periodically, quite independently of the cleanliness or otherwise of the users, by means of a hole scooped out of the stone slab outside the door, which communicated by means of a space under the floor direct with the drain. This hole, it may be mentioned, was closed by means of a stone slab when not actually being used.

The drains, it must be remembered, were periodically and frequently flushed with great force during the wet season by the torrential rains, and indeed one of the main objects of the system† was to afford a rapid means of escape for this surface water, and everything was done to assist this object. Mention has already been made of the shafts to carry off water from the roofs. The light wells were not paved with slabs as the living rooms so often were, but were floored with an exceedingly hard, impenetrable concrete.‡ This concrete flooring was continued over any portion of the building adjacent to the light well where rain was likely to beat in, as the vestibule at Phaestos. These floors had a fall to a definite point where a sink was placed—there is one in the light well of the Hall of the Double Axes partially preserved—while, to prevent wet soaking down to the foundations, the concrete was bevelled up at the point of its junction with the wall. It was the invariable practice to build all light wells in finely jointed ashlar limestone.

Street drainage was also attended to, gutters or channels being provided to carry off the water, as may be seen at Palaikastro § (Fig. 18). That hydraulic science was understood by the Minoans is shown by a stream of water which is conducted down beside the staircase by the Eastern Bastion. A stone channel is carried ¶ down in a series of parabolic curves which retard the flow of the water, which is further retarded as it approaches a sharp turn at the bottom of the flight by deepening the channel and drawing the water away from possible point of overflow by the sudden downward slope of the channel. A small catch-pit for sediment was formed in the level portion of the runnel along the terrace, and the depositing of any sediment was further assisted by a double bend in the channel on either side of this little basin. Similar runnels have been discovered elsewhere, as the Theatral Area, Knossos. Truly, Crete might furnish lessons to many modern so-called sanitarians and hydraulic engineers.

IX.—DECORATION.

(a) ARCHITECTURAL. ¶

Even in a century and a half the pictures of Reynolds have become cracked and faded with age, and give one the impression that they cannot last out many more hundred years. What, then, can

* Evans in *B.S.A.*, VIII.

† *Ibid.*

‡ Mackenzie in *B.S.A.*, XI.

§ R. M. Dawkins in *B.S.A.*, XI.

¶ Evans in *B.S.A.*, VIII.

¶ For the greater portion of the matter in this section the author is indebted to Mr. Fyfe's excellent Paper in *Journal R.I.B.A.*, 1902.

reasonably be expected to remain of paintings executed some three and a half millenniums ago? Yet, great as is the space of time which has elapsed since they were carried out, there still exist to-day numerous remains of coloured decoration which seem to have lost hardly any of their original freshness and life, and which endure with a new meaning such passages from Homer as :—

For, lo! the walls of the chambers and the panels fashioned fair,
And the rafters of the pine tree and the shafts that all uprear
All shine unto mine eyesight, as if with fire ablaze.*

It must have been sober fact and no mere poetic licence when the walls were said to be as if with fire ablaze. Indeed, it is a great question whether modern buildings can show anything to compare with those wonderful prehistoric wall decorations which, as much as anything, show us to what a high artistic standard these people must have attained.

To turn first to the subject of the exterior. The buildings, according to the frescoes, were coloured externally, and though this colouring, as often found in fresco work, may be to a certain extent conventional, there is probably some sort of substratum of actuality underlying it; but as we have so little external colour remains, this part of the subject must remain more or less a matter of conjecture. Of the interior decoration we have considerable remains: one of the most valuable frescoes, from the point of view of gaining knowledge of Minoan decoration and construction, being the "Temple" Fresco, which shows a temple front with columns and various decorative motives. As might be expected, the earlier the date of the work, the simpler, as a rule, is the colour scheme employed. The permanence of the colours used is remarkable, and the colours seem absolutely to be bound into the plaster, having probably been applied while the finishing coat was still wet.

Roughly, half the height of the room would in most cases be occupied by the dado, this dado often, in the more important rooms almost invariably, being of gypsum slabs. The wall in some cases had a projecting base course. Where the plastering was continued down to the floor the lower portion was sometimes painted to imitate marble. Above the dado came a well-defined band which marked the top of doors and windows and in which appeared the ends of the cross beams which have been already mentioned. Next was a broad band of plaster work which formed the favourite position for picture frescoes; and a frieze finished the scheme. There were, of course, many variations of this basic arrangement, such as a double frieze or the substitution of a skirting for the dado. It was the Minoan practice to finish the whole of the plaster in colour, and it has even been suggested that the dado slabs and stone seats were also coloured.† The usual colour of plain painted plaster seems to have been a dark red in the more pretentious buildings, and a very light bluish grey in the houses of the ordinary citizens.‡ Where colours were used in combination, the scheme was usually red with yellow, and blue with black. There was a tendency in some cases to emphasise the vertical constructive line in the decorative scheme, as may be seen in the jambs of some door openings.

A number of plaster fragments have enabled a conjectural restoration of the ceiling decoration to be made, and this has been done in a brilliant manner by Mr. Fyfe.§ The scheme as he has reconstructed it consists of spirals in combination with small rosettes, with quatre-foils at intervals of just over 2 feet centre to centre. Moulded work, both in plaster and stone, seems at one time to have had an important part in the decorative scheme. Fig. 29 B is but one example,

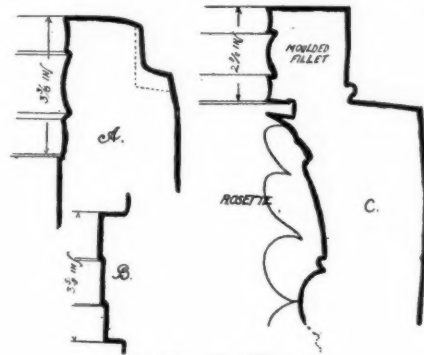


Fig. 29. Mouldings.

* *Odyssey*, XIX. 36.

† Fyfe, *Journal R.I.B.A.*, 1902; Evans in *B.S.A.*, VII.

‡ Hawes' *Crete*.

§ *Journal R.I.B.A.*, 1902.

and shows the remains of an architrave or frieze from Knossos. The mouldings which surrounded frescoes, and helped to divide the wall into compartments, were almost invariably of simple character; but many of the larger and more important mouldings were much more elaborate in section; of these, two typical forms are shown in Fig. 29 (A and B). A sort of moulded relief was also employed in the frescoes themselves, but this modelling was only an auxiliary to the painting, rather than, as in Classical and Mediæval times, the other way about.

In Minoan decoration several motives constantly recur, the chief of these being the triglyph, the rosette, and the spiral. The triglyph motive, so called from its having been considered to be the prototype of the Doric triglyph,* has been discovered not only in Crete, but at Mycenæ,† Tiryns,‡ and Menidi in Attica.§ The usual form of this motive is rectangular—the long axis being horizontal—divided by a vertical member in the centre, the spaces resulting from this division being filled in with half ellipses of ornament. It is significant that this motive, which is eminently constructional, was originally used in places framed for strength.

The rosette, another typical ornament, occurs usually at regular horizontal intervals, and was doubtless suggested by the exposed beam ends which have been mentioned in speaking of construction.

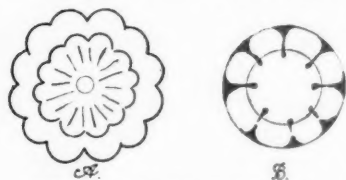


Fig. 30. Two forms of Rosette.

It is also used in conjunction with the spiral motive. These rosettes were frequently carved in stone: an example of this can be seen at Knossos in the remains of the Propylæum overlooking the Southern Terrace, where they are undercut and executed in a porphyry-like limestone, and form part of a frieze or cornice.|| Fyfe distinguishes between two forms of rosette: the "flower," with two series of petals and with distinctly rounded outer edges, and the "beam end," which keeps a more unbroken

circular form and has only a suggestion of radial lines. (See Figs. 30 A and B.)

The most important of all the decorative features is the spiral, which is treated in a variety of ways. It is used as a running frieze, as a subordinate motive in borders, and also as a surface pattern: its use in the latter connection has already been mentioned in speaking of ceiling decoration. The central eye in these spirals almost always produces two or three, and in some cases four, outlets.

Various smaller forms of ornament also exist, as the dentil, the fish-scale, and the lozenge. The value of the horizontal line was keenly appreciated, and it occurs constantly in the decoration. Many of the motives that have been briefly touched upon occur also, with or without modification, in the decoration of the pottery of the period. The superb decoration of some of the bronze vessels that have been found is strongly architectural in character.

(b)—PICTORIAL.

Soul-soothing Art ! whom Morning, Noontide, Even,
Do serve with all their changeful pageantry ;
Thou, with ambition modest yet sublime,
Here, for the sight of mortal men, has given
To one brief moment caught from fleeting time
The appropriate calm of blest eternity.¶

The art of painting was brought among the Minoans to a high state of perfection—a perfection which in many points has never been surpassed by later workers, and which must ever be a lasting rebuke to those who imagine that within the compass of a few hundred years man has achieved everything that is really worthy of endurance in painting.

The number of fragments that have come down to us show that frescoes formed an exceedingly

* Evans, *Mycenean Tree and Pillar Cult*.

† Perrot and Chipiez, *Histoire de l'Art*.

‡ Dörpfeld in Schliemann's *Tiryns*.

§ *Ibid.*

|| Evans in *Journal R.I.B.A.*, 1902.

¶ Wordsworth, *Miscellaneous Sonnets*, IX.

important part of the coloured decoration of the more important buildings. The great halls and corridors must have presented a perfect panorama of scenes from Cretan life. The usual position occupied by these frescoes has already been indicated. There are but few fragments remaining of First Middle Minoan fresco work; what does exist is of formal character and vivid colour. Undoubtedly the finest work of the Minoan artists was executed in M.M. III. Unfortunately almost acres of frescoes must have been destroyed when the later remodellings took place, so the remains we have are somewhat scanty. Yet, small as they are, they are of incalculable value, for they are fragments of surpassing beauty and charm, with all that freshness and spontaneity and grace which always characterises the best work of the best period. There is none of that ostentation which is observable in later work; these frescoes do not seem to be seeking admiration or even notice—those who would appreciate them must seek them out, give some time to them, study them. The admiration of the unthinking and the indiscriminating, which is always given to the work that shouts the loudest, has no value for them: they would rather it passed them by.

The crocus-gatherer of Knossos and the pheasant hunting cat of Haghia Triadha are perhaps the most noteworthy examples of the period remaining to us. The former shows a blue boy gathering white crocuses and arranging them in a vase—

Thou seemest to my fancy, singing here
And gathering flowers, as that fair maiden when
She lost the Spring, and Ceres her more dear;*

the latter a great brown cat watching a pheasant and gathering itself for the spring. The charm and beauty, the true art, displayed in these works would be hard to beat in the work of ages which consider themselves more enlightened.

The frescoes of the Palace Period are, as has been tacitly implied, of a more grandiose and superficial character than the earlier work. Yet in saying this it must not be thought for a moment that this later period did not produce noteworthy work, for there are still remaining many examples showing a masterly handling of subject and a true grasp of the conditions to be complied with. What is meant to be implied is that the spontaneity and naturalness seem to be in large measure lost: there seems more conscious striving after effect, more display of dexterity in workmanship, with an eye all the time as to its effect on the gallery.

Undoubtedly the best known work of this period is the Cup-Bearer, a fresco which was discovered in one of the south-west corridors of the Palace at Knossos. It shows a youth of swarthy skin and black hair, carrying in front of him a long funnel-shaped vase. He wears a loin-cloth of bright colour, and gold bands or bracelets on his arms. In spite of obvious defects of drawing this work is a real creation of genius. Sir Arthur Evans has described it † as "the finest example of figure painting that has survived from prehistoric Greece." Only the lower portion of by far the larger part of the fresco of which this figure was a part—the Processional Fresco—is preserved to us.

Another most interesting fresco is that of the Throne Room. This shows wingless griffins with peacock plumes, backed by a landscape which is somewhat reminiscent of Egypt: perhaps Egyptian influence had swayed its designer, perhaps—though this is a mere idle fancy—this room was used fairly often by ambassadors from Egypt, and the Cretan artist had a commendable desire to make them feel more at home.

Of very different style from those already described is the Toreador Fresco, which shows a boy and two girls performing with bulls. In this work the most violent actions are portrayed, and, as has been remarked,‡ "The artist's temerity in attempting such a composition equals the desperate daring of the performers."

A most interesting suggestion § is the one that in certain cases a sort of pictorial illusion was

* Dante, *Purgatorio*, XXVIII. (Shelley's Translation).

† *Journal R.I.B.A.*, 1902.

‡ Hawes, *Crete*, ch. ix.

§ Evans in *Journal R.I.B.A.*, 1902.

resorted to, such as is found in some Italian villas; light wells, &c., being treated with landscapes in such a manner as to convey the idea—to a person of brilliant imagination—of a distant view.

No attempt has been made to deal with the most fascinating subject of frescoes with any approach to completeness, many well-known examples have not even been mentioned, but enough has been said to indicate the importance of these remains and their position in the architectural scheme of the buildings.

X.—FIXTURES AND FURNISHING.

In speaking of the furnishing of Minoan houses one has to rid one's mind altogether of any idea of the modern complexity of luxury. It has been well said * that the Westerner when he tries to imitate the East in the matter of furnishings arrives at the opposite pole from Eastern simplicity, and crowds into one room what the Oriental would have in twenty. Doubtless to the eyes of the Westerner the Minoan interiors would have appeared somewhat bare; even as the interior of an Eastern dwelling of the present day does. Chairs and tables of wood, though they may have existed, have all disappeared, as have also the hangings, rugs, and skins with which the rooms must have been provided. The most famous seat remaining is the gypsum throne (Fig. 13), which was found in the room bearing its name at Knossos. This, which according to Sir Arthur Evans is a model of an earlier wooden one, is, as can be seen from the photo, extremely Gothic in design, the adornment of the arches on the front of the base, with bud-like crockets, being particularly noteworthy. The whole thing is undoubtedly a remarkable piece of work.

We have a number of seats of the structural type still remaining. One of these (Fig. 31) occurs on the raised stylobate forming the division between the two portions of the megaron at Knossos. It

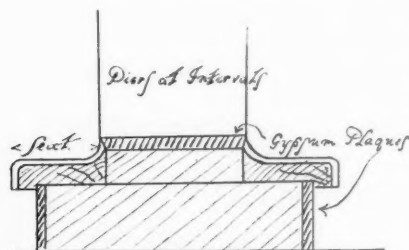


Fig. 31. Knossos: Seat in Queen's Megaron.

was formed of limestone blocks faced with gypsum slabs. Along its centre ran a raised ledge of varied composition, stone, rubble, and plaster, on which were placed gypsum slabs. On the lower portions were put boards resting on the slabs, and these were coated with cement, the surface of which was rounded up against the edge of the centre slabs, forming a most comfortable seat.

Both the Throne Room (Fig. 13) and the Room of the Stone Bench have yielded good examples of stone benches, with pilasters in the front. The megaron of the South-East House also shows low benches on three of its sides.

with tops of gypsum laid on a bed of terra-cotta-covered clay. Seats were often arranged externally at the base of a wall, as on the west wall at Knossos (Fig. 8) or in the Court of the Distaffs, while at Palaikastro † there are porches with recesses for benches still remaining.

Low platforms which may have been covered directly with rugs, &c., or may have served to support beds or couches, are found in some of the rooms of the domestic quarters of the palaces, and in the houses. One, of plaster-covered stonework, occurs in the room of the Plaster Couch at Knossos.

Of cupboards and shelves some few examples have been found. In the Pillar Room of the South-East House ‡ there is a well-defined niche which it is almost certain served the purpose of a cupboard, while in the Palace, underneath the wooden stair which led from the Hall of the Colonnades, was a small stone closet, in which part of the treasures kept in the neighbouring inner room had been hurriedly deposited just before the destruction of the Palace.§

In the house at Gournia round room x on plan (Fig. 5) there was a platform of flags 35 centi-

* Hawes, *Crete*, ch. ii.

† Bosanquet in *B.S.A.*, VIII.

‡ Evans in *B.S.A.*, IX.

§ *Ibid.*

metres wide and 6 to 10 centimetres high, to take oil jars and other domestic utensils, while in the house *F d*, the south room had a wooden shelf 35 centimetres above the floor.

The great chest of Cyprus wood,* in whose top and sides were set the faience plaques which have been of such value in giving us the elevation of the small Minoan house, must not be passed over without mention. It must have been a truly magnificent piece of work with its massive frame-work and pictures representing town and country life. Sir Arthur Evans says we are nearer here than we have ever been before to the shield of Achilles.†

The wonderful Draught Board which Sir Arthur Evans found at Knossos must also be mentioned. It is a most elaborate construction of gold, silver, ivory, and crystal, and is in every way a triumph of workmanship. Amongst the interesting objects which have come down to us, and which fall within the category of "furnishing," are the lamps and pedestals, which were made in the shape of columns and were of clay or stone. In the Pillar Room of the South-East House was found the purple gypsum shaft of one of these pedestals, ornamented with spiral bands of decorative relief of rich design. Circular tables and lamps were also turned out by the potter and stone carver in great numbers.

We can imagine the picturesque scenes in the *magaron* of the palaces when the larger lamps were alight—the great bowls of oil with three or four wicks, on tall standards—sending a fitful glare through the columned chambers, and lighting up the gaily coloured costumes of lords and ladies, listening to sea-tales or adventures of the bull-chase.‡

Pots, kettles, ladles, weights and measures, and many other articles of domestic use, have been found in great numbers, and would be an indication if nothing else remained that their users belonged to a civilised people.

XI.—ARTS AND CRAFTS.

(a)—POTTERY.

Exigencies of time and space will compel a very hurried survey of Minoan Arts and Crafts.

To speak first of Pottery. This is a subject whose interest and importance would make one wish to devote a larger space to its consideration, if only because of its extreme importance as an index of date. In Neolithic times pots were made and polished by hand; they were sometimes decorated—if the term can be allowed—by very rudimentary incisions and rippling, followed a little later by the practice of filling the incisions with chalk. The introduction of the wheel and of the oven, marked a great step forward in the potter's art. Soon after their introduction came the first painting of the clay, and this was done in two ways: first by completely covering the vase with a black paint and drawing on this in white, orange, and red, and second by painting on the buff clay itself. These two methods, it has to be constantly borne in mind, developed side by side; the latter gave a freer form of design than the former, the reason being that the pigments used in the light-on-dark decoration were chalky.§ and consequently could not be applied boldly. Vases were often carved in stone, and were frequently worked as fine as some of our china. One found at Knossos, over 2 feet high, had three handles, and was ornamented with bosses and inlays of metal.

There was a gradual awakening to naturalism amongst the potters in the beginning of Middle Minoan times, such things as the wave and other natural lines attracting them. To this period belong the famous "Kamare" || ware with its beauty of design and its graceful colouring: black, purple, white, cream, brown, &c., having been freely used. The fruit-stand from Palaikastro ¶ is but one example of the style. Towards the close of the period naturalistic designs began to make their appearance, and, as the Polychrome style declined, this naturalistic school came to the front. The designs they produced are full of charm and beauty. The gladiolus, crocus, lily and iris, were the favourite flowers, and the craftsmen showed true artistic insight in their choice of these splendidly

* Evans in *B.S.A.*, VIII.

† *Iliad*, XVIII.

‡ Hawes, *Crete*, ch. ii.

§ Hogarth and Welch in *J.H.S.*, XXI.

|| See Evans in *B.S.A.*, VIII.; Hogarth and Welch in *J.H.S.*, XXI.; and Mackenzie *ibid.* XXIII.

¶ R. M. Dawkins in *B.S.A.*, IX.

decorative flowers. A charming example of this style is the "Vase with Lily Design," found in the south-east magazines at Knossos, and illustrated in *B.S.A. X*. It is to this date, too, that the well-known pithoi belong, with their characteristic form and decoration (Fig. 9).

In the First Late Period there was an increasing tendency towards formality, leading gradually to what has been termed the architectonic style,* the well-known Palace Period. To late Minoan times belong the splendid Boxer and Harvester vases from Haghia Triadha,† the former being a funnel-shaped vase divided into four zones and ornamented with scenes from "the ring," the latter a masterly work showing a procession of harvesters. In addition to clay and stone, bronze was also employed, and in many cases with singular success. It has to be remembered in studying the pottery that, though no mention of them has been made, there were thousands of plain pieces of pottery turned out by the craftsman for the use of the ordinary citizen.

(b)—THE LESSER ARTS.

The Minoans seem to have been equally successful in every department of Art. Not only could they appreciate scale and balance in the erection of buildings, or achieve brilliant results in the province of fresco painting, but they seem to have been equally at home in the lesser arts. The carving of seal stones and gems was a branch of the subject which was brought to great perfection, and numerous examples have come down to us. At Zakro, in one house alone, one hundred and fifty different sealings from rings and gems were discovered.‡ All kinds of objects were laid under contribution to furnish subjects for the artist's skill. Grotesques were a favourite subject, and we have such representations as a bat's wings and human head,§ a man-stag,|| a man-goat ¶ and a sea-monster.** The best examples show great restraint and simplicity, as for example the dragon-flies on a green onyx, discovered in Gournia.†† Jewellery of pure gold has been discovered at Moklos,‡‡ pendants, chains, and necklaces being amongst the articles found.

Of free sculpture on a large scale no example has been found, but attached sculpture—such as the bulls' or lions' heads—still exist to show the skill of the artists in this relief work. Free sculpture in ivory of a small scale is still in some cases left to us. The youths engaged in bull fighting which have been discovered at Knossos show a mastery of material, an anatomical knowledge, and a daring of execution which is nothing short of marvellous.

Crete was famed in ancient times for skill in metal-working, and anyone who is able to examine some of the bronze vessels that have been brought to light will readily understand this. The bronze basin with its lily-bordered and beautiful handle, or the ewer with its bold repoussé work,§§ discovered at Knossos in 1903 by Sir Arthur Evans, must be amongst the most magnificent examples of bronze vessels in the world. A number of fine silver bowls have also been discovered; also "a votive offering of very elegant fern-like sprays of thin gold plate and wire."||| Inlaying was also practised, and fine needlework, hangings, &c., were worked; though, of course, no remains of these have come down to us. Truly the activities of the craftsmen were almost as varied three or four millennia ago as they are to-day.

XII.—OUR DEBT TO CRETE.

The question must inevitably be asked—What is the value of Minoan Architecture? What has been its effect upon the architecture of the modern world? What can we learn from this new-found past which is to be of practical value to us as men actually engaged in the design and erection of buildings?

The last part of the question has been very largely answered in the course of this essay, more particularly in the section dealing with the Palace plan. Sir Arthur Evans has raised the query ¶¶ as

* Hawes, *Crete*, ch. ix.

† Both illustrated in Burrows' *Recent Discoveries*.

‡ Hogarth in *B.S.A.*, VII.

§ Evans in *J.H.S.*, XXII.

|| Evans in *B.S.A.*, IX.

¶ *J.H.S.*, XXII.

** *B.S.A.*, IX.

†† Mrs. Williams in *Gournia*.

‡‡ Hawes, *Crete*, ch. ix.

§§ Evans in *B.S.A.*, IX.

||| Hawes, *Crete*, ch. ix.

¶¶ *Journal R.I.B.A.*, 1902.

to whether the modern architect commissioned to design a palatial residence for a South African millionaire might not be able to glean some hints from Knossos ; and we may well carry the question a good deal further and ask whether such masterly pieces of planning as have been already referred to do not afford many object lessons useful to the architect of, let us say, a modern public building ; or whether there might not sometimes be tried that more intimate relationship between room and room, of which the Minoan architects were such masters.

To turn to the other portion of the question—What has been its effects upon the architecture of the modern world ? One has, in answering this question, to bear in mind the part that Greece is admitted by all scholars to have played in the making of modern Europe—more, in the making of the modern world as it now exists. Speaking broadly, and disregarding factors of lesser importance, modern civilisation may be said to be derived from two sources : on its moral and religious side it is the gift of Palestine, and on its intellectual side—art, literature, and to a large degree thought—it is the gift of classic Greece.

Admitting this, it must be apparent that the mother of classic Greece must be of the utmost possible importance to us to-day. And this mother is now admitted to have been Crete. "The connection between Minoan and Hellenic civilisation is vital, not one of locality alone, as is the tie between the prehistoric and the historic of America, but one of relationship. Egypt may have been foster-mother to classical Greece, but the mother, never forgotten by her child, was Crete."* Crete, only known for long years as the haunt of pirates and the home of insurrections, has now, through the witness of her remains, taken her proper place in the history of the world's civilisations, and the pirates of more modern days are forgotten in the knowledge of her wonderful past,

dwellings of a race of mightier men
And monuments of less ungentle creeds
Tell their own tale to him who wisely heeds
The language which they speak.†

We have found at last the foundations on which the great ones of classical times built, and as a consequence are able to understand the superstructure they raised upon these foundations better than we have ever done before. Knowing what they had to start with, the problems that had been solved and those that still waited for solution, the difficulties that were no longer difficulties because they had been resolved in earlier times, the conditions that were new to the later age and called for new solutions, we are able to appreciate more fully and with greater critical insight the genius of the Greek peoples and to understand points that may previously have been obscure. Every classical student, when this pre-Greek civilisation first came to light, must have had the feelings which Keats has so finely expressed :

Then felt I like some watcher of the skies
When a new planet swims into his ken ;
Or like stout Cortez when, with eagle eyes,
He stared at the Pacific—all his men
Looked at each other with a wild surmise—
Silent, upon a peak in Darien.‡

As Sir Arthur Evans puts it : §

The recent discoveries in Crete have added a new horizon to European civilisation. A new standpoint has been at the same time obtained for surveying not only the Ancient Classical World of Greece and Rome, but the modern world in which we live. This revelation of the past has thus more than an archaeological interest. It concerns all history, and must affect the mental attitude of our own and future generations in many departments of knowledge.

We must never forget the essential unity of this Cretan civilisation, with all that comes after it. Its essential unity within itself it has been endeavoured to show in the course of this essay—in order to keep this unity well to the front the distinction between the different periods which is, of course, to a certain extent arbitrary, has not always been insisted upon—but its unity with historic Greece, Rome, and the Modern World, must also be kept in mind. It had its rise, course, and overthrow,

* Hawes, *Crete* : Introduction.

† Shelley, *Revolt of Islam*, Canto II. xi.

‡ *On First Looking into Chapman's Homer*.

§ Preface to Hawes' *Crete*.

but it rose again from the ashes of its past, in somewhat altered form in Hellenic days, and from thence its influence has spread until it has dominated the whole intellectual world and made all time its debtor.

And downward thence to latest days
The heritage of beauty fell;
And Grecian forms and Grecian lays
Prolonged their humanising spell.
Till when new worlds for man to win
The Atlantic riven waves disclose,
The wildernesses there begin
To blossom with the Grecian rose. ||

CHRONOLOGICAL TABLE.

This table is based on that of Mr. and Mrs. Hawes in *Crete, the Forerunner of Greece*. The Berlin or Minimum System of dating is adopted for the Egyptian Dynasties.

Date, B.C.	Crete.	Aegean Area (Exo-Cretan).	Egypt.
c. 10000-3000	Stone Age (Neolithic): Settlement at Knossos Cave dwelling at Miamia Rock shelter at Magasa House at Magasa... ..	— — — —	— — — —
c. 3315 ...	—	—	Dynasty I.
c. 3000-2800	Transition to bronze	—	—
c. 2800-2600	Early Minoan I.	—	Dynasty IV.: The Pyramids.
c. 2600-2400	Early Minoan II.: Settlements at Vasiliki and Mokhlos ... Burials at Koumasa, Haghia Triadha, and Aghios Onuphrios.	— Burials in Cyclades	— —
c. 2540 ...	—	—	Dynasty VI.
c. 2500 ...	—	2nd City Hissarlik (Troy)	—
c. 2400-2200	Early Minoan III.: Pottery deposits at Gournia, Palaikastro, etc.	— —	—
c. 2200-2100	Middle Minoan I.: Earlier palaces Knossos and Phaestos ...	— —	—
c. 2160 ...	—	—	Dynasty XI.
c. 2100-1900	Middle Minoan II.: First climax at Knossos and Phaestos "Kamares" ware. Earlier palace at Knossos destroyed ...	— — —	— — —
c. 2000 ...	—	—	Dynasty XII.: Beginning of Temple of Ammon at Karnac. Tombs at Beni-Hassan.
c. 1900-1700	Middle Minoan III.: Later Palace at Knossos First Villa at Hagia Triada Earliest houses at Gournia	— — —	— Hyksos or shepherd kings. —
c. 1700-1500	Late Minoan I.: Height of prosperity of smaller towns... 1st Palace Hagia Triadaha Town period, Gournia Later Palace at Phaestos	— — 2nd City Phylakopi — —	— — Dynasty XVII. — —
c. 1580 ...	—	—	Dynasty XVIII.
c. 1500-1450	Late Minoan II. or Palace Period: Remodelling at Knossos Fall of Gournia, Zakro, and Palaikastro	— — Rise of Mycenae, Tiryns, etc. ...	— — Thotmes III.
c. 1450-1200	Late Minoan III.	—	—
c. 1450 ...	Fall of Knossos	—	—
c. 1425-1350	Period of partial re-occupation	—	—
c. 1350-1210	Steady decline	Supremacy of mainland capitals ... 6th City at Hissarlik (Homeric Troy).	Temple of Abu-Simbel. —
c. 1210-1200	Coming of the Northerners Final fall of Minoan civilisation Transition to Iron The Homeric Age	— — — —	Seti I. — — —

|| Lord Houghton.

REVIEWS.

WESTMINSTER HALL ROOF.

Westminster Hall. Report to the First Commissioner of H.M. Works, &c., on the Condition of the Roof Timbers of Westminster Hall, with Suggestions for Maintaining the Stability of the Roof, by Mr. F. Baines, M.V.O., one of the Principal Architects in H.M. Office of Works. (Cd. 7436, 1914) H.M. Stationery Office, London. Price 1s. 4d.

The building, the result of the grandiose schemes of two monarchs who met violent deaths ere they were scarcely completed, has been the subject of two official reports in the last thirty years. Pearson's dealt with the treatment of the hall after the removal of Soane's Courts of Justice. The present one faces a problem that is perhaps unique in the annals of architecture. The principle governing the problem, though it hardly needs emphasising with architects, arises from the realisation of the fact that the works of the past are and will be of vast interest and of great value to present and future generations. The affluence to which the nation has attained—how long to continue now, who knows?—renders possible the solution of the problem. The largest mediæval open-timber roof in Europe, covering an area of over 16,000 square feet, has been found to be in such a state of decay that parts are in danger of collapsing. The problem is to preserve *in situ* every scrap of the moulded and worked face of timbers which have been honeycombed chiefly by the larvæ of one of the Anobiid beetles, *Xestobium tessellatum*. The question divides itself into several parts; to extirpate the *Xestobium tessellatum* and the larvæ of other beetles and moths causing the principal decay, to prevent the re-occurrence of their attacks, to cut out the decayed parts and to piece up with new wood, and to prevent the roof from collapsing.

Appendix II. gives the results of a detailed examination of one of the trusses and one of the bays of the roof out of eight trusses and six bays similarly examined. From it may be gathered the inconceivable ravages caused by the larvæ. Various members have been hollowed out, the decay being worst at the junctions of the timbers with each other. The importance, therefore, of extirpating the larvæ needs no further explanation. Several conditions to be fulfilled by any liquid chosen for this purpose are laid down, fumigation not being considered practicable owing to the large space occupied by the roof. The liquid must (a) penetrate well into the timber by its mere application to the external surfaces; (b) not be inflammable; (c) not smell offensively; (d) not discolour the wood; (e) not be a volatile poison; (f) be a perfect insecticide; (g) be a good timber preservative. Of a number examined and reported upon two solutions stand out from the rest. The Government Analyst, while favouring, in spite of the difficulties, fumigation with sulphur dioxide, suggests camphor dissolved in this gas. Dr. Westergaard, on the other hand, believes in a solution of naphthaline in carbon tetrachloride. The result of their experiments and the Government Analyst's views on the merits of

various other solutions are given in Appendix I. The question as to the best solution will have to be settled finally by experts.

It is hoped that the re-occurrence of the attacks by the larvæ in the old timber may be prevented by the solution chosen. The new timber will probably be treated by a purified tar oil which the Government Analyst has obtained to his specification. This oil, curiously, does not seriously darken new oak, though it does the old. In addition it is proposed to ventilate the lower part of the roof by restoring the dormers which on the west side were removed by Pearson in 1885, and on the east two or three years later. It is not stated by what means the proposed ventilation of the upper part of the roof will be effected other than to the bay carrying the flèche. This will be replaced, possibly on the lines of the original, but in any case with provision for the maximum amount of ventilation.

The problem of piecing out the decayed timber with new raises the question—With what timber shall it be done? That the old timber is oak has been put beyond doubt by microscopic examination, confirmed by the results of the historical investigations made by the architectural staff of the Ancient Monuments Branch. A concise *résumé* of these results, written by the Chief Inspector, mentions that the oak came from the King's Park of Odiham, the Abbot of St. Alban's wood at Bernan, and a wood by Kingston-on-Thames. Besides the sources given in this *résumé* Monkenfrith is also mentioned in the mediæval accounts* as a place from which oak was brought. Kingston-on-Thames, while supplying some of the oak for the roof, provided Hugh Herland, at this time Richard II.'s chief carpenter, with another mark of royal favour other than those by which it is illustrated in the report. He was granted in 1397 "the croppings and coppices (*croppis* and *copicia*) from the trees and timber bought and provided for the Hall which lie cut and remaining over in a wood near Kyngeston upon Thames."† The material which, but for the attacks of the larvæ, has withstood the decay of five centuries, and is as sound to-day as on the day it was erected, requires no other recommendation for its use in piecing up the decayed parts. The employment of other material, such as teak and foreign and colonial oak, with the present comparatively short experience of their qualities and behaviour is therefore rejected. The different species of English oak and their seasoning and conversion are next examined, and it is surprising how contradictory the views of recognised experts are on these matters. Mr. Baines, after weighing all these, has come to the conclusion that the new oak should fulfil the following conditions:—(a) The timber should be open grown oak in park situations, or grown as coppice and standard; (b) the soil in which the timber is grown should be known, and should be a stiff, retentive loam; (c) the species of oak should be

* K. R. Account 473/11.

† Pat. 21 Richard II. m. 7. See also Foreign Roll, 31 F.

the pedunculata, sessile or durmast oak should not be used; (d) timber should be all winter-felled, and no spring or autumn felled oak should be used; (e) The timber should be at least two or three years fallen before conversion, and for great constructional purposes pieces of what is called the "prime log" only should be used, *i.e.* the butt end of the tree from the root to the first outthrow of a big branch; (f) if possible the oak should be seasoned for six months under cover, after being cut to the scantlings in which it is to be used.

Of the 40,000 cubic feet of timber in the roof it is estimated that about 35 to 40 per cent. will have to be replaced if the roof is merely patched where actual decay has taken place. If, however, it were proposed to render the roof self-supporting, as much as 70 or even 80 per cent. would have to be renewed, owing to the fact that much sound timber which is badly perished only at the joints would require to be replaced. This would probably necessitate taking down the whole of some of the trusses. Such wholesale renewal stands condemned upon historical and archaeological grounds. The method proposed, and which has since been approved, is to maintain the roof in its integrity by a full scheme of steel reinforcement, designed so as to affect the appearance of the structure as little as possible, and to afford adequate support to every one of its members. By this means every vestige of the original wood unaffected by decay can be retained, and only certain portions, such as entirely perished purlins, will have to be wholly renewed. A description and several drawings give particulars of this steelwork, which has been designed to fulfil the following conditions:—(1) Not to prejudice seriously the appearance of the roof and the general amenities of the structure; (2) to be adequate not only to carry effectually the weight of the trusses, but to support each main member so that it can be pieced up where decayed, rather than entirely removed; (3) not to transfer too great a thrusting stress on to the walls; (4) to provide against the possibility of collapse in any of the trusses, should further dangerous decay take place. It is proposed to deal with one bay at a time.

For the erection of the steelwork and to carry the part of the roof upon which work is proceeding, a steel centre or scaffolding on rollers has been designed, of which drawings are given. This, if carried to the ridge, will weigh 150 to 170 tons, and will be designed to carry 175 tons. Owing to the decay having affected the joints of the members of the roof it has been necessary to design the centre "to clip and carry each individual member of the truss freely and by itself at points where the timber is sound," and to maintain the trusses absolutely in their present positions without wedging up or drawing together.

The estimated cost of the whole of the work dealt with in the Report is £60,000. Very possibly, as "M.Inst.C.E." wrote in the *Times* of 17th June, an entirely new roof could be erected for much less, and no doubt to his mechanical soul "the result would be

more satisfactory." Far better has it been to leave the solution of the problem to those whose training in "ordinary architecture" he deprecates than to give it to those who, like himself, would, on the score of economy, ruthlessly sweep away a unique memorial of the past.

W. J. DAVIES [J.].

A USEFUL HANDBOOK.

Commercial Paints and Painting: A Handbook for Architects, Engineers, Property Owners, Painters and Decorators, etc. By A. Seymour Jennings. 80. Lond. 1914. 6s. net. [Constable & Co., Ltd., 10 Orange Street, Leicester Square.]

This work, forming one of the publishers' "Westminster Series," aims at giving direct practical information based on the author's experience to those responsible for using and specifying paints, in a reasonable compass and to a greater degree than many works on this large subject.

Paint ingredients are discussed in the first part of the book, a section prefaced by a necessary if somewhat laboured exposition on the economy of good materials. The physical characters of the solid ingredients upon which durability so much depends are discussed in a manner free from technicalities, and their relation to cost is considered. A chapter which should be welcomed by architects, entitled "Paint most suitable for different Surfaces," contains much useful advice on matters which often require more definite specification than they receive, in which connection it should be borne in mind that it is not only the kind of paint, but often the method and time of application which must be regarded to ensure success in the case of wall and special surfaces. The book concludes with an account of the tools and methods employed in application.

To those whose leisure or interest debars them from studying the fuller technicalities of this subject, the book will prove both profitable and palatable, and it may be recommended to architects anxious to treat this trade more fully in their specifications.

ALAN E. MUNBY [F.].

CORRESPONDENCE.

Cessation of Building towards the end of the Tenth Century A.D.

Langston, Eddington: 4th September 1914.

To the Editor, JOURNAL R.I.B.A.,—

SIR,—In a note at the foot of p. 625 in the August number of the JOURNAL we are told that "there was a slackening of effort prior to the year 1000 (when it was supposed that the end of the world was to occur), and a great outbreak of building throughout Europe after that date." This is a statement one often meets with, but surely, as far as England is concerned, the closing years of the tenth century, the time of Edgar and Dunstan, were far from seeing any slackening of building effort—rather, to quote Professor Baldwin Brown, they "witnessed a widely-diffused revival," and with regard to France one need only read the list of buildings mentioned by Saint-Paul in chapter vii. of his *Histoire Monumentale de la*

France, which were "entrepris ou continués dans les vingt dernières années du dixième siècle," to be convinced that the alleged belief in the approaching end of the world by no means arrested the activity of the French builders of that period.

BENJAMIN WALKER [A.].

The Allied Societies and the Institute Funds.

The Guildhall, E.C.

To the Editor, JOURNAL R.I.B.A.—

SIR,—In the JOURNAL of the 25th July (p. 605) you kindly published a letter from me stating that the Allied Societies cost the R.I.B.A. £619 15s. for the year 1913. Mr. Wigfull writes in the August number: "We all know the Allied Societies, as such, do not contribute to the funds of the Institute."

Members may be aware of that fact: I hope they are, but I know that recently many men did not know how much we pay the Allied Societies.

The contributions are in accordance with By-law 82, which states that if a member of the Institute joins an Allied Society the R.I.B.A. shall contribute not more than one-fourth of the annual subscription of that member. In other words, according to the present arrangements, if I join an Allied Society, the funds of the R.I.B.A. would forthwith be mulcted of £1 1s. per annum. Anything more absurd it is hard to imagine. This ridiculous system does not exist in any other similar society.

It certainly seems to me that if a local society is allied to the parent body that the Institute should not at least suffer financially.

Mr. Wigfull writes: "The great majority of our Licentiatees are, I believe, provincial architects." That is true, but he does not tell you how few of them belong to Allied Societies. On the 8th June the provincial Licentiatees numbered 1,293, and only about 440 belonged to Allied Societies. Do our allied friends now want a part of the subscriptions of the Licentiatees?

May I trespass on your space to state that there are many and strong reasons in favour of the Presidents of our leading Allied Societies, such as Birmingham, Liverpool, Manchester, Newcastle and Glasgow, having seats on our Council but to grant that privilege to a new Society containing a minimum of one Fellow of the Institute and 49 outside architects would, I submit, be grossly unfair to our own Fellows and Associates.—Yours faithfully,

SYDNEY PERKS [F.].

The Allied Societies and the Institute.

Baybridge, near Winchester, 3rd Sept., 1914.

To the Editor, JOURNAL R.I.B.A.—

SIR,—Mr. Sydney Perks describes the abbreviation of his statement about the Edinburgh and the Hampshire Architectural Associations by another speaker as "ridiculous." But his full statement as printed is more than ridiculous.

It distinctly implies, and, seeing that he has referred since to it without its correction, it appears to have been intended to imply, that (1) Hampshire members

of the R.I.B.A. are scarcely, if at all, represented in the Hampshire and Isle of Wight Association of Architects, and (2) that the bulk of our members are merely "Gentlemen interested in furthering the Association's objects."

Here are Mr. Perks' words (JOURNAL, 13th June, 1914, p. 520):—

"But our members in the provinces do not, as a rule, belong to the Allied Societies: over two-thirds of the members of Allied Societies are not our members; they are not qualified, they are not necessarily architects. I will give you the exact words from our KALENDAR. In one case they are persons engaged in artistic or collateral pursuits, or interested in the study of architecture; in another case they are gentlemen interested in the furtherance of the objects of the local societies. Take the Edinburgh Association: 'Persons engaged in artistic or collateral pursuits, or interested in the study of architecture.' The other which I quoted is the Hampshire and Isle of Wight Association: 'Gentlemen interested in the furtherance of the objects of the Hampshire and Isle of Wight Association.'"

Now here are the qualifications for membership in the H. & I.W.A.A. (KALENDAR, p. 335) in respect of which Mr. Perks professed to give "the exact words": "The Association consists of three classes of members: (1) Fellows, who must be members of the R.I.B.A.; (2) Associates, being other architects, Assistants, Pupils, or gentlemen engaged in public offices to do architectural work, or interested in the furtherance of the objects of the H. & I.W.A.A.; (3) Honorary members."

It is not necessary to comment on arguments supported in the way Mr. Perks has (unsuccessfully) supported his, but I may say that out of the 33 Fellows and Associates mentioned under "Hampshire" (KALENDAR, p. 242) no less than 20 are members of the local Association, besides whom we have also a retired Fellow, an Honorary Associate, and a recently-elected A.R.I.B.A.

As may be seen from the *fully*-quoted qualifications of membership, this Association could hardly exist were it not for its R.I.B.A. members, who control it entirely, and have done so since its formation.

"I simply plead," said Mr. Perks, "for justice." But would it not be better if he first saw to it that his quotations were full and correct and his insinuations not misleading and unfair?—Yours, etc.,

R. MACDONALD LUCAS [F.].

Hon. Sec. and Treasurer, H. & I.W.A.A.

The Allied Societies.

38 Church Street, Sheffield, 23rd Sept., 1914.

To the Editor, JOURNAL R.I.B.A.—

DEAR SIR,—Mr. Sydney Perks, by his letter in your issue of the 29th August last, appears to be annoyed that attention was called by me to what he styles "ridiculous statements" he made on the 8th June at the R.I.B.A. meeting, but if members will take the trouble to refer to the JOURNAL for the 13th June, page 520, they will be able to see what Mr. Perks said, and from the report and speeches made then and afterwards they can draw their own conclusions.

Yours obediently,

A. F. WATSON [F.].



9 CONDUIT STREET, LONDON, W., 17th October 1914

CHRONICLE.

The Architects' War Committee.

A recent report of the Architects' War Committee (Mr. C. Stanley Peach [F.], *Hon. Secretary*) states that in response to the appeal sent out the sum of £219 5s. for the Prince of Wales's Fund and £664 12s. for the General Fund for the assistance of architects in case of distress arising out of the War have been received up to the 7th October.

In reply to the letter offering the services of architects to the Government the Committee have received a letter of thanks from the Right Hon. Joseph Pease and intimation that the letter has been circulated among the Government Departments interested, and an acknowledgment has also been received from the War Office.

The Committee received a request from the Adjutant of one of the new battalions of Lord Kitchener's Army to provide an architect to get in tenders and superintend the erection of huts, and the request was complied with within a few hours.

The War Committee were also requested to find picked mechanics for special service. The work was undertaken by the Architects' Volunteer Training Corps under the direction of the Architectural Association, and the whole of the men required were found within the time stipulated. Further calls also at very short notice were promptly met.

In this connection the officers of the Architects' Volunteer Training Corps desire to thank the architects and builders of London and the trade organisations for their prompt attention to the appeal and the energetic way in which they have all worked to assist the Government in finding the men wanted. All who helped are requested to accept this notice of thanks, as, in view of the magnitude of the work and the number of letters received, it is quite impossible to write individually.

The Benevolent Sub-Committee are considering, in conjunction with the Architects' Benevolent Society and representatives of the Architects' and Surveyors' Approved Society, a scheme for joint action for the relief of distress among architects which may arise in consequence of the war.

A scheme for finding employment has been out-

lined by Mr. H. V. Lanchester and adopted in principle by the Sub-Committee. The scheme may be described shortly as a proposed inauguration of civic surveys of all the larger cities. The surveys are to cover the following ground: Archaeological, Social and Recreative, Educational, Hygienic, Commercial, Traffic, Valuation. The idea is to provide complete data upon which to base town-planning schemes.

An additional scheme is also being prepared which is based on the original proposals made by the Society of Architects—the measurement of buildings of historical and architectural interest, etc.

The Selection Committee, in co-operation with the Allied Societies, are preparing lists of architects in all parts of the country competent to undertake works which, so far as can be foreseen, are likely to be required by the Government.

A circular letter has been sent to the Allied Societies asking them to draw up schemes for dealing with distress, etc., in their particular localities.

Up to the present time the Committee have no information of any exceptional distress among architects.

An organisation has been formed under Mrs. Maurice Webb to keep in touch with all men at the front who have joined the Regular Forces through the Architects' Volunteer Training Corps, to send them comforts and to look after their wives and families, and see that they have all allowances to which they are entitled and every assistance which can be given.

The wives and daughters of London architects are earnestly requested to give all the assistance in their power to this organisation, and to send any gifts for men at the front to Tufton Street. Mrs. Webb will be glad to hear of any ladies who would be willing to call on the wives and families in their particular neighbourhood, and who would specially look after those in charge of the children of widowers while the fathers are at the front.

The R.I.B.A. Record of Honour: Second List.

The following is a further list of names received in response to the request for information as to Members, Licentiate, and Students of the Institute who are serving their country in the Army or Navy during the War:—

FELLOWS.

Caple, W. H. Dashwood: Major, Royal Engineers.
 Fawcett, E. H.: Major, 3rd Battalion Monmouthshire Regiment (Terr.).
 Fisher, J. W.: Major, 4th Battalion Northamptonshire Regiment.
 Flockton, C. B.: Captain, W. R. D. R. E. (Terr.).
 Lucas, W. L.: Captain, Royal Field Artillery.
 Mathews, Henry Edmund: Captain, 4th Battalion Royal Sussex.

ASSOCIATES.

Bax, E. G.: Artists' Rifles.
 Chetwood, Henry J.: Artists' Rifles.
 Brough, W. J.: Artists' Rifles.
 Chisholm, David J.: London Scottish Regiment (now in France).
 Crowe, J.: 25th (County of London) Cyclist Battalion.

Dosser, John M.: Captain, 2nd Northumbrian Royal Field Artillery (Terr.).
 Dyer, Frank: 6th West Yorkshire Regiment.
 Garbutt, Wilfred T.: 6th West Yorkshire Regiment.
 Gibbs, H. B. S.: Artists' Rifles.
 Hartmann, C. Herbert: Artists' Rifles.
 Lawson, J. Boyd: London Scottish Regiment (now in France).
 Meakin, F.: Sheffield Battalion York and Lancaster Regiment.
 Quicke, W. Dathy: 5th City of London (London Rifle Brigade).
 Rabbula, Ernest A. R.: 1st County of London Yeomanry (London Mounted Brigade).
 Reavell, George, jun.: Major, 7th Battalion Northumberland Fusiliers.
 Roberts, R. G.: Sheffield Battalion York and Lancaster Regiment.
 Robinson, J. C.: Artists' Rifles.
 Scott, Bernard W. H.: 1st Surrey Rifles (Terr.).
 Shears, Reginald: 9th Battalion Queen Victoria Rifles.
 Smith, Edwin T.: R.N. Div., Engineering Unit.

Erratum.—The name of Mr. H. J. Wilson [A.] was inserted in error in the last list [p. 687].

LICENTIATES.

Baines, C. Owen: Royal Engineers (Devon Fortress Section) (Terr.).
 Dane, H. E.: Cinque Ports Fortress Royal Engineers.
 Hammond, F. S.: Captain, 11th County of London Battalion.
 Hawkes, T. E.: Queen's Westminster Rifles.
 Helboerner, P. M.: Reservist, French Army.
 Masey, Cecil: 2nd London Brigade, Royal Field Artillery.
 Page, G. M.: South Notts Hussars.
 Richardson, H. T.: 4th King's Shropshire Light Infantry (Terr.).
 Richardson, John E.: Honourable Artillery Company.
 Smith, G. T.: Honourable Artillery Company.

STUDENTS.

Dicksee, H. J. H.: Artists' Rifles.
 Dunston, C. C.: Lieutenant, A Battery Honourable Artillery Company.
 Hooper, Arnold F.: Lieutenant, 5th Battalion Royal West Kent Regiment.
 Keesey, W. M.: Royal Engineers.
 Knott, A. J.: South African Artillery.
 Odum, J. H.: Sherwood Foresters.
 Philip, R. M. H.: King Edward's Horse.
 Portsmouth, O. S.: Lieutenant, 1st Welsh Brigade (Howitzer) R.F.A. (Terr.).
 Ripley, C. Gurney: Lieutenant, Army Service Corps.
 Rylatt, A.: 5th Battalion Notts and Derby Regiment.
 Snell, A.: Territorials.
 Waddington, Harold G.: Duke of Lancaster's Own Yeomanry.

Lieut. Arnold Hooper, mentioned above, is a son of Mr. Francis Hooper [F]. His elder brother, Lieut. Kenneth Hooper, of the East Lancashire Regiment, was wounded near Cambrai on the 26th August, and is reported missing.

Mr. Briant A. Poulter [*Licentiate*], of the firm of Tubbs (Cyril B.), Messer (Arthur A.) & Poulter, of London, Newbury, and Bexhill-on-Sea, writes: "In reply to your appeal, my two partners have taken motorambulances to France, my London staff has joined the army, and I am a special constable and have lent two of my rooms to the Voluntary Assistance Department; so feel we have done our duty."

The regiment to which Major H. Phillips Fletcher [F.] and Lieut. C. D. Carus-Wilson [A.] belong is the Middlesex Hussars (1st County of London

Yeomanry)—not the Duke of Cambridge's, as described in the last issue.

Mr. Laurence Direks, son of the Librarian of the Institute, has been gazetted Lieutenant of the London Irish Rifles.

The Timber Supply: Board of Trade Conference.

At the invitation of the Board of Trade delegates of the R.I.B.A. were present at a Conference of representatives of the building trade which had been arranged by the Board to consider the question of present and prospective supplies of timber for building purposes. The Conference was held on the 6th inst., and was attended by Messrs. Max Clarke [F.], Alan E. Munby [F.], and Ernest Flint [F.] on behalf of the Institute, and by representatives of the National Federation of Building Trades Employers, the Institute of Builders, the London Master Builders' Association, and officials of the Board of Trade. One of the questions discussed was the matter of shortage, and to what extent it could be remedied by substitutions from other sources of supply outside the war area. It was suggested that there were suitable substitute timbers of Canadian growth—red pine, for example—which might be made more available through the good offices of the Board of Trade Commission now in Canada for the purpose of obtaining substitute supplies of pit-prop timbers. As regards prices, reports received by the builders' organization and the Board of Trade showed that the cost of deals, battens, and boards had advanced from 15 to 20 per cent., and in some districts as much as 33 per cent. It was suggested that a joint committee, representing merchants, builders, architects, and governing authorities, might be constituted for the purpose of considering the question of supplies and prices. Another suggestion was that the Government should extend its marine insurance arrangements to cover timber cargoes in neutral bottoms.

The Building Trade.

The Chancellor of the Exchequer, replying to the Workers' Committee deputation on the 6th inst., said that he had been informed, with regard to the building trade, that things were improving steadily, but that there was a good deal of unemployment. He had had a discussion with the First Commissioner of Works (Lord Emmott), and they thought it desirable to take full powers this year for the erection of all the Government buildings which they thought they should have to undertake in the course of the next two years. They intended to put down a very considerable sum on the Estimates, and they could either begin those works or postpone them, according to the necessities of the case. A good many post offices and Government buildings of one kind and another no doubt would have to be erected in the course of the next five years. In the ordinary course he should have spread those buildings over the Estimates of the next five or six years; now most of them would probably be

crowded into the Estimates of the coming year. The advantage of that would be that they could watch the state of the building market, and if it looked as if there were going to be considerable distress, they could put forward those buildings, or postpone them, as the case might be. At any rate, they were going to take full powers for the erection of those buildings.

The War: Sympathy from America.

Mr. Irving K. Pond, the distinguished Chicago architect, lately President of the American Institute of Architects, in a letter to Mr. Raymond Unwin [*F.*] asks him to convey to his professional brethren whom he met during his visit in England an expression of his sympathy and encouragement in this time of stress and trouble. "Every man in America," says Mr. Pond, "who believes in democracy as opposed to militarism is with you in this struggle; every man in this country who believes that treaties should not be broken nor neutrality violated in the stress of war is with you."

The Architectural Association.

Mr. H. Austen Hall [*F.*], Acting President of the A. A. in the absence of Mr. Maurice Webb who is serving with the Colours, writes:—

"There have been many inquiries as to whether the Architectural Association is carrying on its educational work during this crisis in national affairs, and I, therefore, should like to make it known as far as possible that everything is being carried on as in normal times. The Day and Evening Classes are necessarily depleted by the patriotic response of a large number of students to Lord Kitchener's appeal; but there are still many students who, for various reasons, are unable to join the Forces, and these are very properly continuing their studies. I would urge the importance of all students continuing their educational work if they are unable to enlist.

"Apart from the work in the School, considerable recruiting is going forward at 18 Tufton Street from the ranks of architects and men of kindred professions, and also (at the request of the authorities) amongst skilled mechanics connected with the building trade.

"I feel sure that members and others will be glad to know that the A.A. is carrying on its work and doing its best in other ways to be of some practical service to the country."

Comforts for Architects on Service.

Mrs. Maurice Webb, whose husband, the President of the Architectural Association, is serving with the Royal Engineers, writes:

I feel sure that architects will be interested to know that some 150 members of the Architectural Association, including the President of the A.A., are now serving in the Army and the Territorials. Several instances have come to my notice of unnecessary hardships owing to the lack of simple comforts. It has been suggested by some of the men themselves that the Association might act as a central body to

look after, as far as possible, the interests of the A.A. men and their friends serving with the Colours either at home or abroad.

For this purpose a small sub-committee has been formed which is in touch with the various units to find out their immediate wants. I attach below a list of the articles that are now most wanted, and I earnestly ask for assistance. All offers of help and gifts in money and kind should be addressed to me at the offices of the Association, 18, Tufton Street, Westminster, S.W., and I shall be very glad to give any further information to inquiries sent to me at that address.

List of articles required: Blankets, belts (knitted or woven), sleeping helmets, flannel shirts, socks, towels, soap, tobacco, cigarettes, papers (daily and weekly), magazines.

Rheims Cathedral: Official Statement of Damage.

The damage done to Rheims Cathedral is officially given in a note issued from Bordeaux by the French Under-Secretary of State for Fine Arts, which says:

"Rheims Cathedral was shelled several times. It had all the roofing burned and the stained-glass windows riddled, and to a large extent broken.

"The northern tower of the façade, which was struck by shells in the upper part over the portal, was seriously damaged by flames. The sculptural decorations and statues are irreparable.

"Inside the church, straw, which had been collected for the wounded, caught fire, generally damaging the stonework. The wall facings are burnt and the masonry charred.

"Instructions have been given to protect the vaults by building temporary roofing."

The Chadwick Trust and the War.

The following resolution has been passed by the Chadwick Trustees:—

"That in view of the immense importance of encouraging in every way the promotion of careful sanitary organisation in the Naval and Military Services during the present campaign the Chadwick Trustees have resolved under the powers conferred upon them under the Scheme they administer to announce their intention to award at the close of this year the Chadwick Gold Medal and £50 each to the Naval and Military Medical Officer respectively in the British Service who shall have distinguished himself most in promoting the health of the men in the Navy and the Army.

The nomination for such presentations to be, as provided by the terms of the Trust, by the Directors-General of the Naval and Military Medical Services respectively."

The Chadwick Trustees are also making arrangements for providing, or assisting in the provision of, lectures and demonstrations on Naval, Military and Hospital Hygiene. Particulars of these lectures will shortly be announced.

The Alexander Thomson Travelling Studentship.

Mr. C. J. Maclean, Secretary of the Glasgow Institute of Architects, writes that owing to the war the Trustees have decided to postpone the compe-

tion for this Studentship for one year. All students who were eligible this year and have now gone on military duty will be allowed to compete when the competition is held.

New Feeble-Minded Colony at Prudhoe.

The Northern Counties Joint Poor Law Committee at their September meeting held at the Newcastle Union Offices, appointed Messrs. J. H. Morton [F.] and J. G. Burrell [Licentiate], of South Shields, Durham, and Newcastle-upon-Tyne, joint architects to carry out the buildings for the new feeble-minded colony to be erected at Prudhoe Hall.

School of Art Wood-carving.

The School of Art Wood-carving, 39, Thurloe Place, South Kensington, which is under Royal patronage, has been reopened after the usual summer vacation, and we are requested to state that some of the free studentships in the evening classes maintained by means of funds granted to the school by the London County Council are vacant. The day classes of the school are held from 9 to 1 and 2 to 5 on five days of the week, and from 9 to 1 on Saturdays. The evening class meets on three evenings a week and on Saturday afternoons. Forms of application for the free studentships and any further particulars relating to the school may be obtained from the Secretary.

Rodin's "Burghers of Calais."

Rodin's statuary group, "Burghers of Calais," the gift of the National Art-Collections Fund, has been placed in position in the Victoria Tower Gardens, Westminster. It stands on a pedestal 17 feet high, and with the mass of the Victoria Tower as a background has a much more effective setting than the original at Calais. The site was the choice of M. Rodin himself after a tour through London last summer. The casting of the group was done in France, and the work brought to this country some months ago, since when it has lain in the vaults of the Houses of Parliament.

Louvain.

The *Architectural Review* for October is devoted almost exclusively to the tragedy of Louvain, and 12 beautifully produced plates and numerous smaller illustrations are given of the chief architectural treasures of the city as they existed before the war, together with photographic views showing the wreck and ruin that followed upon the German visitation. Judging from the photographs, some quarters of the city have been blotted out altogether, and others are so battered and mutilated as to be scarcely recognisable even by their own people. The publishers are to be congratulated upon the timely production of this valuable record of the late city, one of the most cherished possessions of a martyred country.

COMPETITIONS.

Federal Parliament Houses, Canberra.

Owing to the state of war existing, the Government of the Commonwealth of Australia has decided to postpone, until a more favourable time, the competition for the design of the Federal Parliament Houses to be built at Canberra. It was intended that the competition should be open to architects from all parts of the world, and that it should close in London and Melbourne during March 1915.

Northampton Water Works Committee: Competition for Workmen's Dwellings, Hollowell.

Members and Licentiates of the Royal Institute of British Architects must not take part in the above competition because the conditions are not in accordance with the published Regulations of the Royal Institute for Architectural Competitions.

By Order of the Council.

29th September 1914.

IAN MACALISTER, Secretary.

THE EXAMINATIONS.

The Final: Designs approved.

The Board of Architectural Education announce that the designs submitted by the following Students who are qualifying for the Final Examination have been approved:—

SUBJECT XVI.

(a) DESIGN FOR AN ISLAND HOTEL AND TEA GARDENS.

Cashmore: F. M.	Hossack: J. D.	Lawton: W. V.
Fraser: R.	Howcroft: G. B.	Pace: C. L.
Heywood: L.	Koch: M. D. N.	St. Leger: C. D.

(b) DESIGN FOR A DAIRY AND FARMSTEAD.

Blackburn: N. A.	Keep: N.	Rayson: T.
Chandler: H. F.	Lawton: W. V.	Stedham: P. N.
Farrer: J. C.	Mackey: S. A. H.	Venn: G. O.
Grellier: C.	Moore: J.	Wood: A. G.
Horsburgh: A. L.	Nathanielsz, J. J.	

OTHER SUBJECTS.

Fisher: H. N., Design for College Library.
Smith: A., Design for Group of Cottages.

The Intermediate Examination: Exemption.

Mr. Walter Morekton Keesey, A.R.C.A. [*Probatior* 1913], of 2 Priory Gardens, Bedford Park, W., having satisfied the Board of Architectural Education as to his qualifications and training, has been granted exemption from sitting for the Intermediate Examination and has been registered as Student R.I.B.A.

The Architects' Benevolent Society.

The Architects' Benevolent Society have received an intimation from Miss Rose that her aunt, Mrs. Arthur Cates, has left to the Society a legacy of £1,000.